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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/588,675	08/08/2006	Makoto Nunoya	MM9339PCT(US)	9231

22203 7590 09/16/2009

KUSNER & JAFFE
HIGHLAND PLACE SUITE 310
6151 WILSON MILLS ROAD
HIGHLAND HEIGHTS, OH 44143

EXAMINER
HERNANDEZ, MANUEL J

ART UNIT	PAPER NUMBER
2858	

MAIL DATE	DELIVERY MODE
09/16/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/588,675	NUNOYA ET AL.	
	Examiner	Art Unit	
	MANUEL HERNANDEZ	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 June 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4,6 and 7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *7* is/are allowed.

6)☒ Claim(s) *1 and 6* is/are rejected.

7)☒ Claim(s) *3 and 4* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 June 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Receipt is acknowledged of the amendment filed on 6/4/2009, and the IDS filed on 8/8/2006, which have been entered in the file. Claims 1, 3, 4, 6, and 7 are pending.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishino et al (US 5,709,291) in view of Hayashi et al (US 2002/0024828), and in further view of Ferens (US 5,757,634).

Regarding claim 1, Nishino et al disclose a non-contact power supply system (Abstract) utilizing synchronized command signals to control and correct phase differences amongst power supply units, the system comprising:

a moving body (71, Figure 12);

a plurality of induction lines arranged sequentially along a moving path (78, M, Figure 12; M, 14, Figure 1) of the moving body and adjusted to an equal impedance at a predetermined frequency (column 5, lines 26-32); and

a plurality of power supply units (78, M, Figure 12) respectively transforming direct current to alternating current of the predetermined frequency by means of a plurality of switching devices (51, 52, Figure 4) each driven by a rectangular wave signal (M, Figure 4), and feeding the transformed current as output current to the induction lines (14, Figure 4; column 4, lines 9-21),

the moving body including a pickup coil (16, Figure 4) facing the induction lines (14, Figure 4), the moving body having a load varying in power consumption (lines 13-14, column 7), the load being fed with power from electromotive force induced to the pickup coil (column 1, lines 65-67), wherein

the power supply units each has a command signal of the predetermined frequency to drive the switching devices (51, 52, Figure 4, signal shown between 51 and 52; column 4, 15-18).

Nishino et al fail to disclose measuring and calculation units to determine phase differences and the utilization of the phase difference to advance or delay the rectangular wave signal in response to the command signal.

Hayashi et al teach the power supply units each includes a measuring unit (61, Figure 1; ¶ 0043) for measuring power consumption (¶ 0009; ¶ 0043) and output current (64, Figure 1) fed to the induction lines and a calculation unit for determining a phase difference between the output current fed to the induction lines and the rectangular wave signal based on the output current and power consumption measured by the measuring unit (¶ 0009), and

the power supply units each advances or delays the rectangular wave signal in response to the command signal according to the phase difference determined by the calculation unit, thereby to drive the switching devices (¶ 0009; ¶ 0043).

It would have been obvious one of ordinary skill in the art at the time of the invention to modify the non-contact power supply of Nishino et al to include the phase regulator of Hayashi et al. One would have been motivated to include the phase regulator to have to avoid cross current from flowing from one power supply to the other and therefore prevent breakage of circuit components (¶ 0004; ¶ 0008).

Nishino et al as modified by Hayashi et al teach the non-contact power supply system as described above but fail to disclose the transmission of the command signal

as a signal for compensating for a phase delay between subsequent power supply units.

Ferens discloses a specific one of the power supply units (10, Figure 2) and the other power supply units (12, 14, Figure 2) are connected in series via signal transmission lines (MAIN PWM and I_{ref}),

the specific power supply unit has a command signal of the predetermined frequency to drive the switching devices (column 6, lines 4-8), advances or delays the rectangular wave signal in response to the command signal according to the phase difference determined by the calculation unit (column 6, lines 38-42; column 7, lines 31-37), thereby to drive the switching devices, and transmits, to the downstream power supply unit, the command signal as a signal for compensating for a phase delay between the specific power supply unit and the power supply unit connected downstream (column 6, lines 27-30), the phase delay being caused by a length of the signal transmission line (inherent, length of line causes delay and system of Ferens compensates for delays), and

each of the other power supply units advances or delays the rectangular wave signal in response to the command signal having been received from the power supply unit connected upstream according to the phase difference determined by the calculation unit (column 6, lines 38-42; column 7, lines 31-37), thereby to drive the switching devices, and transmits, to the downstream power supply unit, the received command signal as a signal for compensating for a phase delay between the power

supply unit and the power supply unit connected downstream (column 6, lines 27-30), the phase delay being caused by a length of the signal transmission line.

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the command signal of Ferens in the non-contact power supply system of Nishino et al as modified by Hayashi et al. One would have been motivated to include the command signal in order to provide a pulse-by-pulse current tracking system wichi allows a level of dynamic performance to be maintained at the same level as the performance of a single inverter (Ferens, column 4, lines 29-31).

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishino et al (US 5,709,291) in view of Hayashi et al (US 2002/0024828) and Ferens (US 5,757,634) as applied to claim 1 above, in further view of Kazutoshi (US 7,009,860).

Regarding claim 6, Nishino et al as modified by Hayashi et al and Ferens teach the non-contact power supply system as described above, but fail to disclose a capacitor and variable inductor connected in series with the induction lines.

Kazutoshi discloses a capacitor and a variable inductor are connected in series with the induction lines, and the induction lines, capacitor, and variable inductor connected in series have an impedance of the predetermined frequency set as a capacitive reactance (column 1, lines 56-59).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the non-contact power supply of Nishino et al and Hayashi et al by providing a capacitor and variable inductor in series with the induction lines in

order to suppress fluctuation of the current in the lines when the circuit load varies (Kazutoshi, column 1, lines 61-63).

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishino et al (US 5,709,291) in view of Hayashi et al (US 2002/0024828).

Regarding claim 7, Nishino et al discloses a non-contact power supply system utilizing synchronized command signals to control and correct phase differences amongst power supply units (Abstract, Title) in which a plurality of induction lines adjusted to the same impedance at a predetermined frequency (column 5, lines 26-32) are sequentially placed along a moving path (Figure 12, 78, M, Figure 1, M, 14) of a moving body, the system comprising power supply units (Figure 12, 78, M) each transforming direct current to alternating current of the predetermined frequency by means of a plurality of switching devices (Figure 4, 51, 52) driven by a rectangular wave signal (Figure 4, M) and feeding the current as output current to the induction lines (Figure 4, 14, column 4, lines 9-21), the moving body including a pickup coil (Figure 4, 16) facing the induction lines (Figure 4, 14), the moving body having a load of varying power consumption (column 7, lines 13-14), the load being fed with power from electromotive force induced to the pickup coil (column 1, lines 65-67),

wherein each of the power supply units has a command signal of the predetermined frequency to drive the switching devices (Figure 4, 51, 52, signal shown between 51 and 52, column 4, 15-18),

Nishino et al fails to disclose a power consumption measuring unit and a storage unit used to advance or delay the rectangular wave signal in response to the command signal.

However, Hayashi et al discloses the power supply unit includes: a measuring unit for measuring power consumption (¶ 0009, ¶ 0054) of the induction lines having been fed with the output current, and a storage unit for storing beforehand the output frequencies based on the phase angle, and the power supply unit searches the storage unit according to the power consumption (¶ 0061, ¶ 0065, ¶ 0066) measured by the measuring unit to determine the output frequency based on the phase angle, and advances or delays the rectangular wave signal in response to the command signal according to the determined phase difference, and drives the switching devices (¶ 0060, ¶ 0061). Hayashi discloses the known concept of utilizing storage units to control the switching devices based on the phase angle, and it would therefore have been obvious to include the phase angle stored in the storage unit.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the non-contact power supply of Nishino to include the measuring and storage units of Hayashi et al. One would have been motivated to include the measuring and storage units so that the command signal is corrected to prevent variations in the output voltage regulator to avoid cross current from flowing from one power supply to the other and therefore prevent breakage of circuit components (¶ 0004, lines 3-6, ¶ 0008, ¶ 0059, lines 5-7).

Response to Arguments

9. Applicant's arguments, see page 10, lines 1-17, filed 6/4/2009, with respect to the rejection(s) of claim(s) 3 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the newly found prior art reference Ferens (US 5,757,634), which discloses the transmission of the command signal as a signal for phase delay compensation.

10. Applicant's arguments, see page 10, lines 19-28, filed 6/4/2009, with respect to the rejection(s) of claim 7 under 35 U.S.C. 103(a) has been fully considered and is persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the different interpretation of the previously applied reference.

Allowable Subject Matter

11. Claims 3 and 4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter:

a. Regarding claim 3, the prior art (Nishino et al, US 5,709,291; Hayashi et al, US 2002/0024828; Ferens, 5,757,634; Kazutoshi, 7,009,860) disclose the non-contact power supply system as described above but fail to disclose the

specific power supply and each of the other power supplies includes a phase adjustment circuit and a phase difference detection circuit as described.

b. Regarding claim 4, this claim is dependant on claim 3, and is therefore allowable for the same reasons as the dependant claim 3.

c. Furthermore, none of the other prior art of record, taken alone or in combination, teaches or suggests these claim features.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Premerlani (US 5,958,060), Lentini et al (US 4,886,981), and Colombi et al (US 2006/0167569) are cited to show relevant power supply systems. Sunden (US 7,117,383) and Saeki (US 2002/0048335) are cited to show a phase delay control system. Aoki (US 2005/0068009) is cited to show a non-contact power supply system utilizing a memory. Caruthers et al (US 6,466,469) and Caruthers et al (US 2004/0208029) are cited to show a master-slave arrangement of converters. Takasan et al (US 6,089,362) is cited to show a relevant non-contact power supply system. Boys et al (US 5,898,579) is cited to show a non-contact power distribution system controlling the resonant frequency.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MANUEL HERNANDEZ whose telephone number is (571)270-7916. The examiner can normally be reached on 5/4/9 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Assouad can be reached on 571-272-2210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M.H./
9/16/09
/Patrick J Assouad/

Supervisory Patent Examiner, Art Unit 2862